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were put into a U-tube with the filter paper on which they had been soaked. Air was drawn through the apparatus for 30 minutes, after which the carbon dioxid was determined at 3-hour intervals for a period of 9 hours in most of the experiments. The solvents used in the different experiments were alcohol, ether, anilin, chloroform, ethyl acetate, turpentine, benzine, olive oil, acetone, benzene, and toluene.

In each case two parallel experiments were conducted, one with toluene vapor drawn through the tube, and one without. In the first experiment in which living germs were used they were found rotted at the end of the 9-hour period in the tube without toluene. In the other cases it was found that the amount of carbon dioxid evolved varied according to the solvent with which the germs had been extracted. The order arranged according to the intensity of depression is as follows: alcohol, ethyl acetate, ether, benzine, chloroform, aniline, turpentine, olive oil, benzene, acetone, toluene. In the tubes with toluene this sequence is different, but the toluene vapor in every case caused a depression of the amount of carbon dioxid evolved. The authors point out that there is a general relation between the quantity of lipoids dissolved by acetone, benzene, chloroform, ether, and alcohol, and the depressing effect of these substances on respiration. There is, however, no strict proportionality between the quantity of lipoids removed and the depression of respiration, as would be expected if the depression were due only to the removal of lipoids and not to other possible effects of the solvents.—H. HASSELBRING.

Germination.—GASSNER¹⁰ has studied the germination characters of seeds of two South American grasses, *Chloris ciliata* and *C. disichophylla*. The behavior of the two species is in the main the same, so we need consider only the results with *C. ciliata*, on which the main work was done. With dry storage the seeds show a marked after-ripening. The most favorable period of dry storage is 30–40 weeks. With 10 weeks or less of dry storage none will germinate in darkness at optimum temperature, but after 39 weeks 7–8 per cent will germinate under the same conditions. After 9 weeks of dry storage, only 3 per cent germinate in light, but after 39 weeks 73 per cent respond under the same conditions. If the germinators are dark during the early periods of germination and then transferred to light, the early subjection to darkness greatly reduces the total percentage of germination; the seeds become “dunkelharten.” This effect of darkness appears only when the temperature is above the minimum for germination (20° C.). At low temperatures (6–10° C.) the germination is not affected by such a period of darkness. GASSNER lines the experimental facts up with the conditions the seed must meet in nature, which gives great ecological significance to his results. Whatever the ecological value of such work, it must be stated that it adds little to a funda-

¹⁰ GASSNER, GUSTAV, Ueber Keimungsbedingungen einiger südamerikanischer Gramineensamen. Ber. Deutsch. Bot. Gesell. 28:350–364. 1910.

mental knowledge of delayed germination. From the physiological side we need to know the structures producing the delay, and how they are acted upon by the various conditions that will shorten it. GASSNER mentions two classes of seeds favored in their germination by light: the "dunkelharten" type, *C. ciliata* and *Ranunculus scleratus*; and those that are not affected by a period of darkness, *Poa* and many others.—WILLIAM CROCKER.

Osmotic pressure of leaves.—DIXON and ATKINS¹¹ have devised a thermo-electric method for determining the freezing points of juices of plants. The advantage of the apparatus over BECKMANN'S lies in the fact that the determination can be made with 2.5–5 cc. of liquid instead of 12 cc. or more. The apparatus was used for determining the osmotic pressures of the sap of foliage leaves. The osmotic pressure varied with different species and individuals under the same conditions, but was constant for an individual under a given condition. In an individual of *Syringa vulgaris*, change of condition brought about a change in pressure from 24.58 to 11.58 atmospheres. The amount of pressure was not determined by the height of the leaves above the ground, nor by the resistance of the conducting tracts supplying the leaves, but in every case the osmotic pressure was much greater than the tension of the water supply could have been. Variations were attributed in the main to variations in carbohydrate and water content. The osmotic pressure of leaves increased with insolation, loss of water, and age. The highest osmotic pressure found for *Syringa vulgaris* was 26.87 atmospheres. The authors believe that during summer, when sugars are abundant and transpiration great, leaves of *Syringa* may develop a pressure as high as 30–40 atmospheres. The high pressures of leaves is quite in contrast to the pressures of roots of the same species. The pressures in the roots varies from 4 to 6 atmospheres. These data of course furnish support for the cohesion theory of rise of sap. One wonders how closely the osmotic pressure of extracted juices corresponds to that of the living cells.—WILLIAM CROCKER.

Oxidation of hydrogen by microorganisms.—NIKLEWSKI'S¹² full report of work, which has been intermittently in progress since 1904, makes an interesting and valuable contribution. The study includes the isolation of two species of rod bacteria which are both morphologically and physiologically distinguishable. Neither of the two species isolated can develop in an oxygen-hydrogen atmosphere without the company of the other, but when both are present under suitable conditions for growth a condensation of the oxygen-hydrogen gas occurs. If an inorganic nutrient medium is inoculated with

¹¹ DIXON, H. H., and ATKINS, W. R. G., On osmotic pressures in plants; and on a thermo-electric method of determining freezing points. Sci. Proc. Roy. Soc. Dublin N.S. 12:275–311. 1910.

¹² NIKLEWSKI, BRONISLAW, Ueber die Wasserstoffoxydation durch Mikroorganismen. Jahrb. Wiss. Bot. 48:113–142. 1910.